United States Patent [19]

Tarnofsky

[11] **3,784,174**

[45] **Jan. 8, 1974**

[54] **CARBURETOR FOR MODEL AIRCRAFT**

[76] Inventor: **Benjamin Tarnofsky**, 942 Grow, St. Laurent, Quebec, Canada

[22] Filed: **Aug. 31, 1972**

[21] Appl. No.: **285,497**

[52] **U.S. Cl.** ..... **261/65**, 261/DIG. 2, 244/77 C, 46/244 R, 261/71

[51] **Int. Cl.** **F02m 17/34**

[58] **Field of Search** ..... 261/DIG. 2, 65, 71; 244/77 C; 46/244 R

[56] **References Cited**

UNITED STATES PATENTS

1,974,884	9/1934	Opel	244/77 C
2,012,020	8/1935	Perrier	261/44 A
3,141,634	7/1964	Rhoads et al.	244/77 C
3,547,415	12/1970	Perry	261/50 R

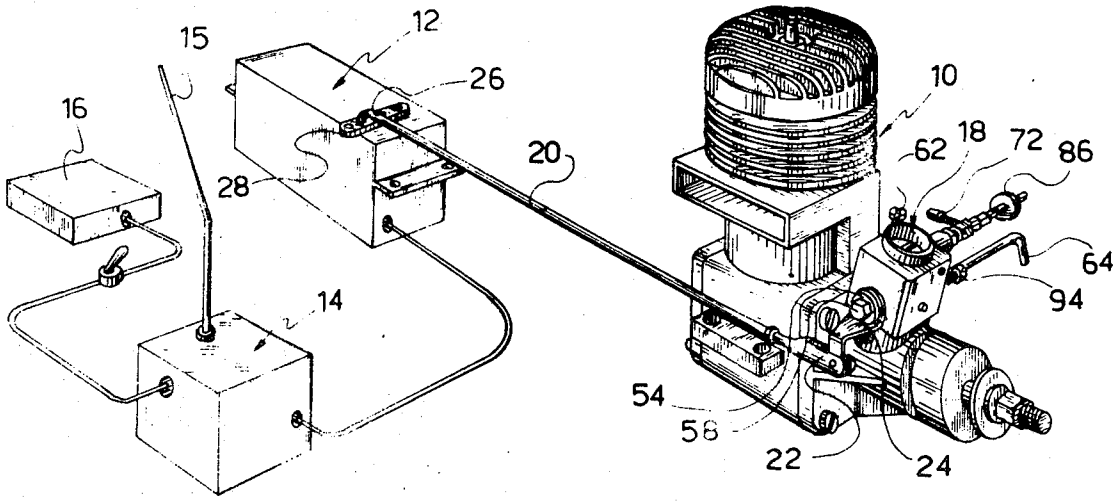
Primary Examiner—Tim R. Miles

Attorney—John W. Malley et al.

[57] **ABSTRACT**

An adjustable friction clutch is provided for the lever arm of the throttle valve permitting it to override when the throttle valve reaches a limit stop thus allowing the rotary arm linking the carburetor to a remote controlled servo mechanism operating the carburetor to reach maximum travel; as a result, unnecessary battery current drain and induced load to the servo mechanism are avoided.

7 Claims, 5 Drawing Figures



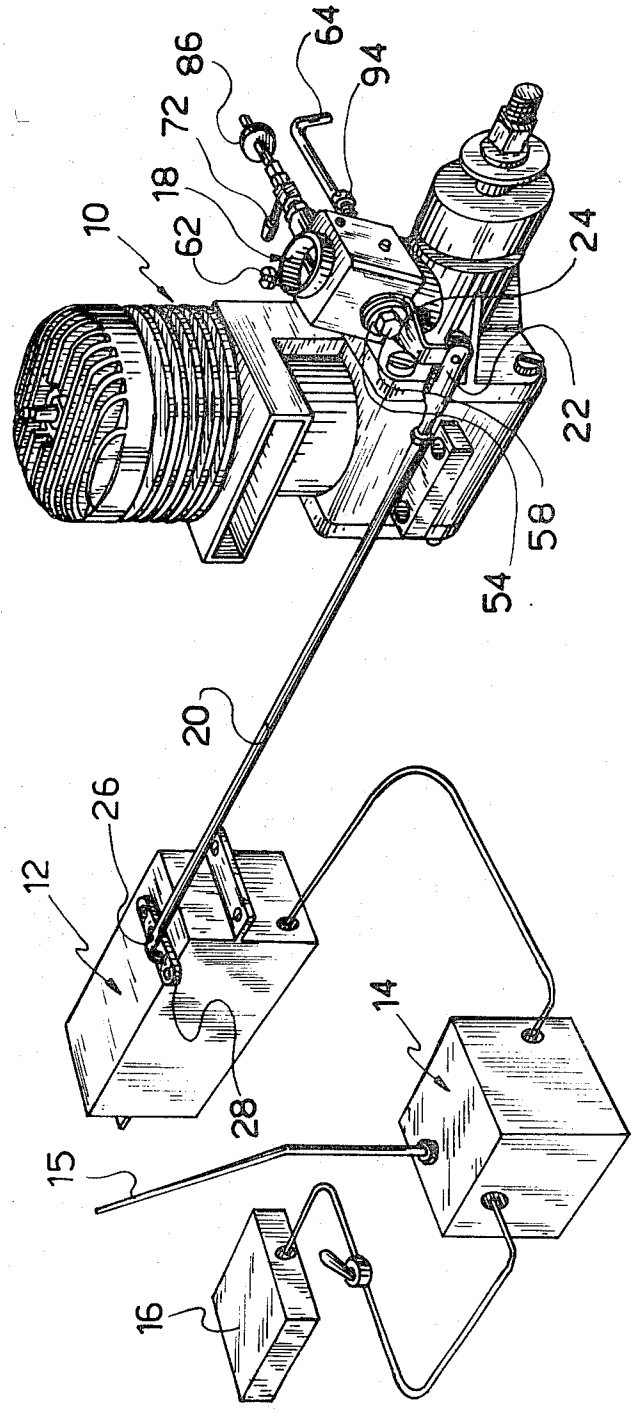


FIG.1

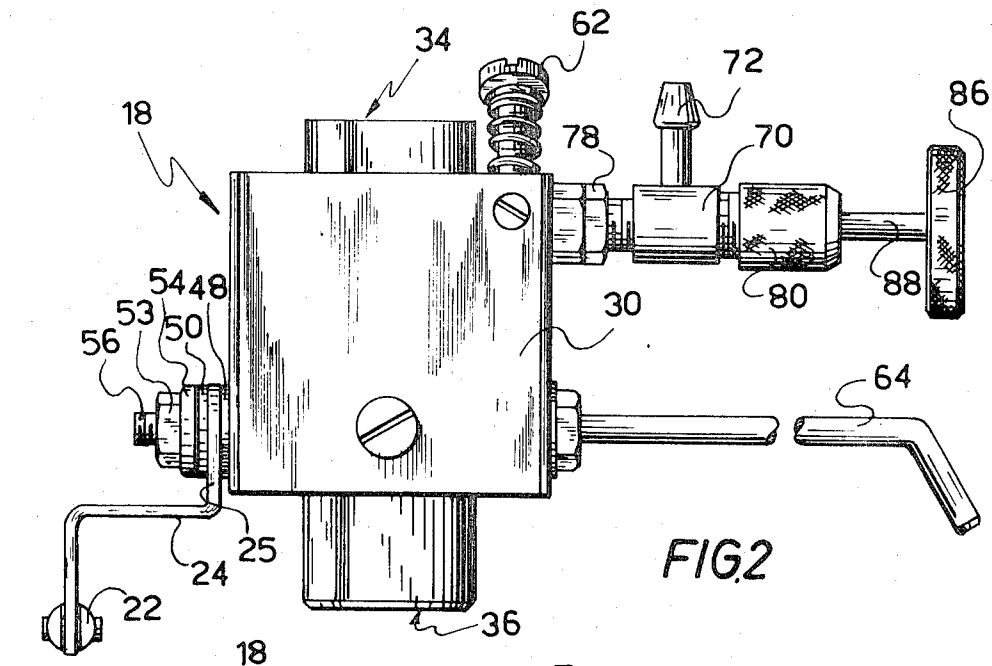

34
62
72
86
18
78
70
54
48
53
50
56
80
88
30
64
25
24
22
36

FIG.2

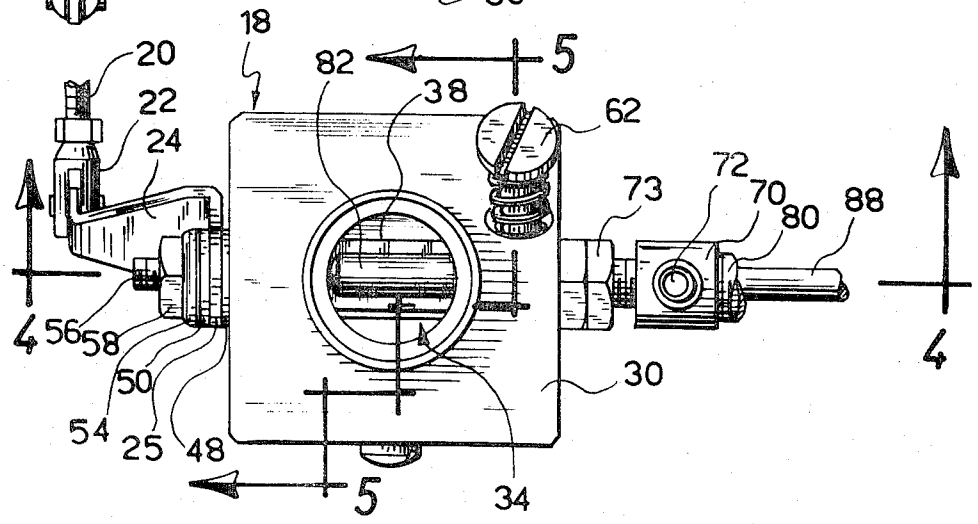

18
20
82
5
38
62
22
24
72
73
70
80
88
4
56
58
50
54
25
48
30
5
34
4

FIG.3

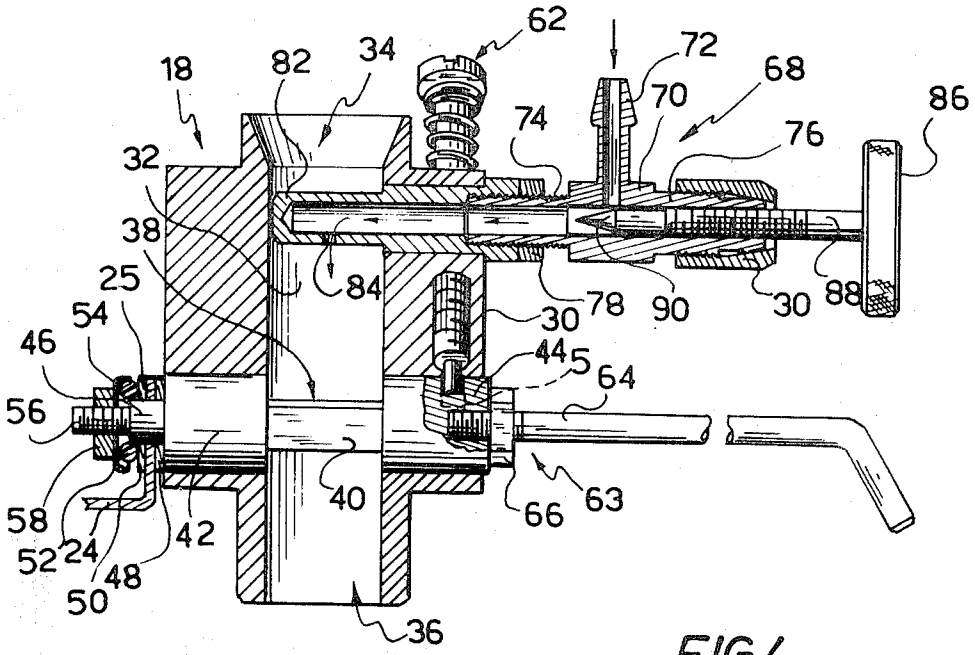

62
72
68
86
18
82
34
74
70
76
32
38
84
78
90
30
88
25
54
30
46
44
5
64
56
40
66
63
58
52
24
48
42
50
36

FIG.4

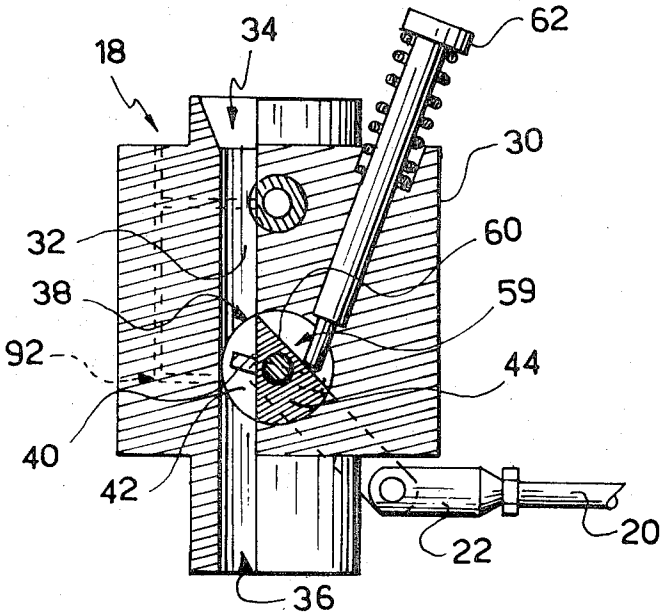

62
34
18
30
60
32
59
38
92
44
40
42
22
20
36

FIG.5

CARBURETOR FOR MODEL AIRCRAFT

This invention relates generally to carburetors for miniature internal combustion engines and, more particularly, to a carburetor for the internal combustion engine of a model aircraft.

The lever arm of the throttle valve of a model aircraft carburetor is linked to a battery operated servo mechanism which, in turn, is remotely controlled by means of signals received from a radio transmitter operated by the user or "modeller." On command from the radio transmitter, the radio receiver in the model aircraft picks up signals and relates them to the servo mechanism which causes the lever arm to move the throttle valve within limits. If, during flight, the throttle valve is actuated to a limit stop, continuous actuation of the servo mechanism only results in excessive battery current drain and abnormal load against the servo gear train. This is quite a major problem since, due to the size of the model aircraft, battery capacity is limited. Secondly, the servo mechanism is a costly component of the aircraft.

A further disadvantage of carburetors presently used with model aircraft is that, since this sport is usually practiced in fields where there are more than one aircraft being flown at one time, and since the number of radio frequencies available is limited, some "modellers" must wait until the others terminate their flying so that they can use their radio frequency. Furthermore, because model aircraft are frequency operated, engine adjustments on the ground are carried out while still utilizing a frequency thereby preventing others from flying their aircraft during that time.

It is an object of this invention to provide a novel carburetor for model aircraft.

It is an object of this invention to provide a carburetor for a model aircraft which prevents excessive battery current drain and induced load to the servo mechanism.

It is a further object of the present invention to provide a carburetor for a model aircraft permitting engine adjustment without the use of a frequency for so doing.

The present invention therefore relates to a carburetor for the internal combustion engine of a model aircraft remotely controlled by a servo mechanism which comprises housing means having a passageway therethrough, fuel inlet means to discharge fuel in the passageway to form a fuel mixture therein, throttle valve means transversely mounted in the passageway for controlling the flow of fuel mixture through the passageway, the throttle valve means including a pair of opposite end sections rotatably supported in the housing means, lever means having one end operatively connected to one of the end sections and having the other end adapted to be operatively linked to the servo mechanism of the model aircraft, and friction clutch means mounted on the said one end section of the throttle valve means allowing the lever means to override after the throttle valve means has moved to a preset limit thereby avoiding unnecessary battery current drain and induced load to the servo mechanism.

In one preferred form of the invention, the other end section of the throttle valve means is provided with manual lever means.

Other objects, purposes and characteristic features of the present invention will be in part obvious from the accompanying drawings, and in part pointed out as the

description of the invention progresses. In describing the invention in detail, reference will be made to the accompanying drawings, in which like reference characters designate corresponding parts throughout the several views, and in which:

FIG. 1 is a perspective view showing the main components of a model aircraft associated with the present invention;

FIG. 2 is a side elevational view of the carburetor made in accordance with the present invention;

FIG. 3 is a top plan view of the carburetor illustrated in FIG. 2;

FIG. 4 is a cross-sectional view taken along lines 4—4 of FIG. 3; and

FIG. 5 is a cross-sectional view taken along lines 5—5 of FIG. 3.

Referring to FIG. 1, there are shown some of the components which are mounted in a model aircraft; they include an engine **10** of the internal combustion type, a servo mechanism **12** which is electrically connected to a radio receiver **14** which, in turn, is made operable by switching on a battery **16.** Associated with the engine **10,** is a carburetor **18** made in accordance with the present invention. Carburetor **18** is operated by means of a link rod **20** which has one end **22** fixed to the carburetor lever **24** and the other end **26** received in a rotary arm **28** mounted on the servo mechanism **12.**

Referring more particularly to FIGS. 2 – 5, carburetor **18** comprises a housing **30** having a passageway **32** therethrough in the form of a cylindrical bore. The air inlet being designated **34** and the fuel mixture outlet into the engine intake manifold (not shown) being designated **36.** The passageway **32** is controlled by a throttle valve **38** of the butterfly type which includes a flat central portion **40** and two drum-like end sections **42** and **44** which are rotatably supported in housing **30.** A first end section **42** includes a shaft **46** on which is secured one extremity of lever **24.** One novel feature of the present invention is the provision on this end section of the throttle valve of an adjustable friction clutch assembly which includes a pair of nylon washers **48** and **50** on either side of the end **25** of the lever **24** and also of an O-ring **52** which is enclosed in a clutch cover **54.** Shaft **46** has a threaded portion **56** to receive an elastic nut **58** for the adjustment of the friction clutch assembly.

Referring to FIG. **5,** the opposite end section **44** of the throttle valve includes a groove **59** with an inner surface **60** which cooperates with the lower end of a spring-biased screw **62** to set the limit for the rotational travel of the throttle valve. The butterfly may be rotated manually, by means of second lever means **63** which includes, for example, a threaded arm **64** received in end section **44** and secured thereto by a lock nut **66.**

Another feature of the present invention is the fuel metering assembly, generally designated by reference numeral **68.** This assembly includes a connecting member **70** having a fuel inlet portion **72** and two threaded end portions **74** and **76** on which are respectively mounted a lock nut **78** and a collet type lock nut **80.** Threaded portion **74** is engaged in the high-speed inlet **82** which has an orifice **84** disposed in the cylindrical bore passageway **32** of the carburetor housing. The other threaded portion **76** of the fuel metering assembly is engaged with a needle valve **86** having a stem **88**

with a tapered end **90** which controls the rate of fuel flow to the carburetor. As illustrated in dotted lines in FIG. **5**, a low-speed passageway **92** is provided adjacent the throttle valve **38**; the rate of fuel flow through this inlet is controlled by a low-speed needle **94** (see FIG. **1**).

During operation, on command from the radio transmitter operated by the modeller, the receiver **14** by means of antenna **15** picks up the radio signals, relates them to the servo mechanism **12** and causes it to move arm **28** which, in turn, actuates rod **20** and lever **24** thereby rotating the throttle valve against the limit stop surface **60.** The motion of the servo arm **28** is adjusted to travel after the throttle lever **24** has reached a stop to insure the positioning of the butterfly in its correct location. This, however, induces an abnormal load against the servo gear train and electric motor. With the present invention, the adjustable friction clutch permits the throttle lever to slip when the butterfly is rotated to the preset limit and thus allows the servo arm to reach its maximum travel. As a result, life expectancy of equipment is prolonged. Since the throttle lever **24** is now equipped with this adjustable friction clutch, the butterfly may now be rotated manually through rod **64** on the opposite end of the butterfly. Engine adjustment is now possible without resorting to the use of the radio equipment. A saving in battery power and an increase of life expectancy are again realized. A further advantage of the adjustable friction clutch of the present invention affords the "modeller" the opportunity to rotate the throttle lever to any angle degree to suit the installation of the servo without resorting to releasing it as is the case in present fixed throttle levers.

The fuel metering assembly gives the "modeller" the choice to remove the fuel metering assembly, clean it, and reassemble it to the carburetor body without fear of losing the original needle valve setting. The fuel inlet **72** which is an integral part of the assembly can be rotated in position to any desired angle and then locked to suit the installation of the gas line to the tank.

Although the invention has been described above in relation to one specific form, it will be evident to those skilled in the art that it may be refined and modified in various ways. It is therefore wished to have it understood that the present invention is not limited in interpretation except by the terms of the following claims.

What I claim is:

1. A carburetor for use with the internal combustion engine of a model aircraft remotely controlled by a servo mechanism comprising housing means having a passageway therethrough; fuel inlet means to discharge fuel in said passageway to form a fuel mixture therein; throttle valve means transversely mounted in said passageway for controlling the flow of fuel mixture through the passageway, said throttle valve means including a pair of opposite end sections rotatably supported in said housing means; lever means having one end operatively connected to a first of said pair of end sections of said throttle valve means and having the other end operatively linked to the servo mechanism of the model aircraft; and friction clutch means mounted on said first end section of the throttle valve means allowing said lever means to override after said throttle valve means have moved through a preset limit thereby avoiding unnecessary battery current drain and induced load to the servo mechanism in the model aircraft.

2. A carburetor as defined in claim **1** further comprising scond lever means for manually controlling said throttle valve means whereby carburetor adjustment is made possible independently of the servo mechanism of the model aircraft.

3. A carburetor as defined in claim **2** wherein said second lever means are secured on the opposite end section of said throttle valve means.

4. A carburetor as defined in claim **1** wherein said opposite end section of said throttle valve means includes a groove, and screw means mounted in said housing means cooperating with an inner surface of said groove for providing said preset limit for the rotation of said throttle valve means in said housing means.

5. A carburetor as defined in claim **1** wherein said friction clutch means are adjustable.

6. A carburetor as defined in claim **1** further comprising a fuel metering assembly for connection with at least one of said fuel inlet means, said assembly comprising a member adapted for connection with said housing means, said member having a central passageway receiving therein a needle valve having a tapered end, said member further comprising a second passageway for receiving fuel, said tapered end being adjustably positioned adjacent said second passageway whereby said assembly may be removed and reassembled from said housing means without affecting the original needle valve setting.

7. A carburetor as defined in claim **1** wherein said inlet means include a high-speed fuel passage above said throttle valve means, and a low-speed fuel passage adjacent said throttle valve means.

* * * * *